TRACKING AND ACTING ON ONE AND DONE

FIELD OF THE INVENTION

The present invention is directed generally to servicing a contactor in a contact center and specifically to routing or directing contacts to appropriate contact center resources.

BACKGROUND OF THE INVENTION

Contact centers, such as Automatic Call Distribution or ACD systems, are employed by many enterprises to service customer contacts. A typical contact center includes a switch and/or server to receive and route incoming packet-switched and/or circuit-switched contacts and one or more resources, such as human agents and automated resources (*e.g.*, Interactive Voice Response (IVR) units), to service the incoming contacts. Contact centers distribute contacts, whether inbound or outbound, for servicing to any suitable resource according to predefined criteria. In many existing systems, the criteria for servicing the contact from the moment that the contact center becomes aware of the contact until the contact is connected to an agent are customer-specifiable (*i.e.*, programmable by the operator of the contact center), via a capability called contact vectoring. Normally in present-day ACDs when the ACD system's controller detects that an agent has become available to handle a contact, the controller identifies all predefined contact-handling skills of the agent (usually in some order of priority) and delivers to the agent the highest-priority oldest contact that matches the agent's highest-priority skill. Generally, the only condition that results in a contact not being delivered to an available agent is that there are no contacts waiting to be handled.

Most present-day contact-distribution algorithms focus on being "fair" to callers and to agents. This fairness is reflected by the standard first-in, first-out contact to most-idle-agent assignment algorithm. Skills-based routing improves upon this basic algorithm in that it allows each agent to be slotted into a number of agent groups based on the agent's skill types and levels.

The primary objective of call-distribution algorithms is to ultimately maximize contact center performance and profitability. That may involve minimizing cost, maximizing contact throughput, and/or maximizing revenue, among others. For example, when a new contact arrives, the contact should be handled by an agent who either has the ability to produce the most revenue or can handle the contact in the shortest amount of time. Also, when an agent becomes available to handle a new contact, the agent should handle either the contact that has the possibility of generating the most revenue or the contact which the agent is most efficient in handling.

An important consideration in minimizing contact center operating costs and maximizing contact center revenue is servicing a customer's needs in as few contacts as possible. Whether the contact center is sales or services repeated contacts by a customer to accomplish one transaction causes the contact center's costs of serving that customer to rise and service wait times to increase, which lowers contact center profitability and increases customer dissatisfaction, thereby lowering revenue. The challenge to contact center administrators is tracking whether a current contact is related to a prior contact and therefore is not "one-and-done". As a result of this challenge current contact centers do not measure the percentage of contacts that are "one-and-done"

Existing contact centers do allow for the tracking of "trouble" tickets (*e.g.*, WebQ/QQ™ business application). These trouble ticket applications can retrieve open and closed trouble tickets and display them to agents. It may even be possible, through integration, to push the most recent trouble tickets to an agent upon delivering a contact. Existing contact centers, however, do not allow for the identification of a current contact that is associated with a prior contact by the same customer that was not "one-and-done" let alone making contact-handling decisions for the current contact based upon this identification to decrease the likelihood that the customer's needs will not be serviced in the current contact.

SUMMARY OF THE INVENTION

These and other needs are addressed by the various embodiments and configurations of the present invention. The present invention is directed generally to the tracking and use in contact center operations of instances of repetitive contacts by the same customer related to the same issue. As will be appreciated, the contacts can be inbound or outbound contacts or some combination thereof. For example, a second outbound/inbound contact can follow a first outbound/inbound contact or a second outbound/inbound contact can follow a first inbound/outbound contact.

In one embodiment, the present invention is directed to a contact center that includes:

(a) an input operable to receive a first contact from or initiate a first contact with a first customer;

(b) a selector operable (i) to determine whether the first contact is related to a previous contact with the first customer and (ii) when the first contact is related to another

contact with the first customer, to service the contact differently than when the first contact is unrelated to another contact with the first customer; and/or

(c) a repeat contact determining agent operable (i) to track, for a set of the plurality of agents over a selected or specified time period, a number of contacts serviced by the set of agents that are or are not related to a previous and/or subsequent contact serviced by the set of agents and (ii) to maintain, for the set of agents, an indicator indicating one or more of (a) a number of contacts serviced by the set of agents during the selected time period, that are not related to a previous and/or subsequent contact serviced by the set of agents and (b) a number of contacts, serviced by the set of agents during the selected time period, that are related to a previous and/or subsequent contact serviced by the set of agents.

The "relatedness" of another contact to a present or current contact is generally assumed to be present when the two contacts are related to the same issue and/or customer purpose or need. There are numerous techniques that may be used to identify related contacts, including information provided by the customer to a contact center resource, the presence of matching subject matter indicators for the two contacts, the timing of the two contacts, information received by the agent(s) servicing the contacts, transaction identifier, reservation number, a common number (customer number, issue tracking number, order number, or ticket number), and the like.

The contact(s) may be real-time or non-real-time contact(s). A real-time contact refers to a contact in which the contacting entity or customer is present during the waiting (or queuing) period and can choose to abandon or disconnect the contact if the contact is not serviced within an acceptable period. Common examples include voice contacts, VoIP, text-

chat, video contacts, and the like. A non-real-time contact refers to a contact in which the contacting entity or customer is unable to abandon or disconnect the contact. Common examples include e-mail, fax, electronic or paper documents, webform submissions, voice messages, and the like.

The set of agents can have one or more agent members. The membership of the set can be defined based on one or more suitable criteria, such as skill(s), expertise, experience, and the like.

The related first and second contacts can be received on the same channel/communication medium or on different channels/communication media. For example, the first contact can be in the form of email and the second contact in the form of a live voice communication. The first and second contacts can alternatively both be in the form of emails or live voice communications.

The present invention can have several advantages when compared to conventional systems. For example, the contact center of the present invention can determine whether a current contact is related to a prior contact and whether the contact had to be served by multiple servers (*e.g.*, agents) in the same transaction. This in turn permits the contact center to determine the number or percentage of contacts, on a contact center, agent-by-agent, or skill-by-skill basis that are or are not "one-and-done". This information can be important for at least two purposes. First, the information can be used to identify performance issues at the contact center or agent level. Agents taking longer to service contacts but having a higher one-and-done completion rate can now be recognized and suitably rewarded. In existing contact centers, such agents have been incorrectly viewed as being of less value to the

contact center. The cause(s) of performance issues can also be identified using such information and appropriate actions taken to address the causes. Examples of possible causes of instances of repetitive related contacts include inadequate agent training, problem customers, product quality issues. Second, the information can be used to make a contact-handling decision for a current contact that is related to one or more previous contacts by the same customer. This ability can permit such repetitive contacts to receive different and/or better service than contacts unrelated to prior contacts, thereby decreasing rates of repetitive related contacts, increasing contact center performance efficiency and profitability, decreasing customer frustration dissatisfaction, and defection-leaving to take their business elsewhere, and increasing revenue from customer sales. In short, the present invention permits a contact center to measure itself and its resources against its one-and-done objectives and take appropriate action, on an agent or contact level, when the objective is not met.

The contact center can determine if a customer has a high rate of not one and done contacts and follow up with that customer to determine if there is an issue. The results can be used to identify not only.one and done situations. For example, a customer may be contacting the contact center multiple times using the same purpose indicator when the customer is really dealing with different issues or the customer simply wants to "talk" to someone. The agents should not be negatively affected if the customer is "re-using" a purpose indicator or if the customer just needs someone to talk to. An example is the person who orders something everyday so that a UPS employee shows up every day; therefore, giving the person someone to talk to. The results of the inquiry could be used to help direct

future contacts, such as directing the customer to lower cost agent resources (e.g., not human agents).

These and other advantages will be apparent from the disclosure of the invention(s) contained herein.

The above-described embodiments and configurations are neither complete nor exhaustive. As will be appreciated, other embodiments of the invention are possible utilizing, alone or in combination, one or more of the features set forth above or described in detail below.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram depicting a contact center according to an embodiment of the present invention;

Fig. 2 is a block diagram of a server according to an embodiment of the present invention;

Fig. 3 is a flow chart depicting an operational embodiment of the agent and contact selector; and

Fig. 4 is a flow chart depicting an operational embodiment of the repeat contact determining agent.

DETAILED DESCRIPTION

The invention will be illustrated below in conjunction with an exemplary communication system. Although well suited for use with, *e.g.*, a system having an ACD

or other similar contact processing switch, the invention is not limited to use with any particular type of communication system switch or configuration of system elements. Those skilled in the art will recognize that the disclosed techniques may be used in any communication application in which it is desirable to provide improved contact processing.

Fig. 1 shows an illustrative embodiment of the present invention. A contact center 100 comprises a central server 110, a set of data stores or databases 114 containing contact or customer related information and other information that can enhance the value and efficiency of the contact processing, and a plurality of servers, namely a voice mail server 118, an Interactive Voice Response unit or IVR 122, and other servers 126, a switch 130, a plurality of working agents operating packet-switched (first) telecommunication devices 134-1 to N (such as computer work stations or personal computers), and/or circuit-switched (second) telecommunication devices 138-1 to M, all interconnected by a local area network LAN (or wide area network WAN) 142. The servers can be connected via optional communication lines 146 to the switch 130. As will be appreciated, the other servers 126 can also include a scanner (which is normally not connected to the switch 130 or Web server), VoIP software, video contact software, voice messaging software, an IP voice server, a fax server, a web server, and an email server) and the like. The switch 130 is connected via a plurality of trunks 150 to the Public Switch Telecommunication Network or PSTN 154 and via link(s) 152 to the second telecommunication devices 138-1 to M. A gateway 158 is positioned between the server 110 and the packet-switched network 162 to process communications passing between the server 110 and the network 162.

The term "switch" or "server" as used herein should be understood to include a PBX, an ACD, an enterprise switch, or other type of telecommunications system switch or server, as well as other types of processor-based communication control devices such as media servers, computers, adjuncts, *etc.*

Referring to Fig. 2, one possible configuration of the server 110 is depicted. The server 110 is in communication with a plurality of customer communication lines 200a-y (which can be one or more trunks, phone lines, etc.) and agent communication line 204 (which can be a voice-and-data transmission line such as LAN 142 and/or a circuit switched voice line 140). The server 110 can include a Basic Call Management System or BCMS 224 and a Call Management System or CMS 228 that gathers contact records and contact-center statistics for use in generating contact-center reports. CMS and BCMS and any other reporting system will hereinafter be referred to jointly as CMS 228.

The switch 130 and/or server 110 can be any architecture for directing contacts to one or more telecommunication devices. Illustratively, the switch and/or server can be a modified form of the subscriber-premises equipment disclosed in U.S. Patents 6,192,122; 6,173,053; 6,163,607; 5,982,873; 5,905,793; 5,828,747; and 5,206,903, all of which are incorporated herein by this reference; Avaya Inc.'s Definity™ Private-Branch Exchange (PBX)-based ACD system; MultiVantage™ PBX, CRM Central 2000 Server™, Communication Manager™, S8300™ media server, and/or Avaya Interaction Center™. Typically, the switch/server is a stored-program-controlled system that conventionally includes interfaces to external communication links, a communications switching fabric, service circuits (*e.g.,* tone generators, announcement circuits, *etc.*), memory for storing

control programs and data, and a processor (*i.e.*, a computer) for executing the stored control programs to control the interfaces and the fabric and to provide automatic contact-distribution functionality. The switch and/or server typically include a network interface card (not shown) to provide services to the serviced telecommunication devices. Other types of known switches and servers are well known in the art and therefore not described in detail herein.

Referring to Fig. 2, included among the data stored in the server 110 is a set of contact queues 208a-n and a separate set of agent queues 212a-n. Each contact queue 208a-n corresponds to a different set of agent skills, as does each agent queue 212a-n. Conventionally, contacts are prioritized and either are enqueued in individual ones of the contact queues 208a-n in their order of priority or are enqueued in different ones of a plurality of contact queues that correspond to a different priority. Likewise, each agent's skills are prioritized according to his or her level of expertise in that skill, and either agents are enqueued in individual ones of agent queues 212a-n in their order of expertise level or are enqueued in different ones of a plurality of agent queues 212a-n that correspond to a skill and each one of which corresponds to a different expertise level. Included among the control programs in the server 110 is a vector or workflow 216. Contacts incoming to the contact center are assigned by contact vector 216 to different contact queues 208a-n based upon a number of predetermined criteria, including customer identity, customer needs, contact center needs, current contact center queue lengths, customer value, and the agent skill that is required for the proper handling of the contact. Agents who are available for handling contacts are assigned to agent queues 212a-n based upon the skills that they possess. An

agent may have multiple skills, and hence may be assigned to multiple agent queues 212a-n simultaneously. Furthermore, an agent may have different levels of skill expertise (*e.g.*, skill levels 1-N in one configuration or merely primary skills and secondary skills in another configuration), and hence may be assigned to different agent queues 212a-n at different expertise levels. Contact vectoring is described in DEFINITY Communications System Generic 3 Contact Vectoring/Expert Agent Selection (EAS) Guide, AT&T publication no. 555-230-520 (Issue 3, Nov. 1993). Skills-based ACD is described in further detail in U.S. Patents 6,173,053 and 5,206,903.

Referring to Fig. 1, the gateway 158 can be Avaya Inc.'s, G700 Media Gateway™ and may be implemented as hardware such as via an adjunct processor (as shown) or as a chip in the server.

The first telecommunication devices 134-1, . . . 134-N are packet-switched and can include, for example, IP hardphones such as the Avaya Inc.'s, 4600 Series IP Phones™ , IP softphones such as Avaya Inc.'s, IP Softphone™, Personal Digital Assistants or PDAs, Personal Computers or PCs, laptops, packet-based H.320 video phones and conferencing units, packet-based voice messaging and response units, any communication device, and packet-based traditional computer telephony adjuncts.

The second telecommunication devices 138-1, . . . 138-M are circuit-switched. Each of the telecommunication devices 138-1, . . . 138-M corresponds to one of a set of internal extensions Ext1, . . . ExtM, respectively. These extensions are referred to herein as "internal" in that they are extensions within the premises that are directly serviced by the switch. More particularly, these extensions correspond to conventional telecommunication

device endpoints serviced by the switch/server, and the switch/server can direct incoming contacts to and receive outgoing contacts from these extensions in a conventional manner. The second telecommunication devices can include, for example, wired and wireless telephones, PDAs, H.320 video phones and conferencing units, voice messaging and response units, and traditional computer telephony adjuncts.

It should be noted that the invention does not require any particular type of information transport medium between switch or server and first and second telecommunication devices, *i.e.,* the invention may be implemented with any desired type of transport medium as well as combinations of different types of transport medium.

The packet-switched network 162 can be any data and/or distributed processing network, such as the Internet. The network 162 typically includes proxies (not shown), registrars (not shown), and routers (not shown) for managing packet flows.

The packet-switched network 162 is in communication with an external first telecommunication device 174 via a gateway 178, and the circuit-switched network 154 with an external second telecommunication device 180. These telecommunication devices are referred to as "external" in that they are not directly supported as telecommunication device endpoints by the switch or server. The telecommunication devices 174 and 180 are an example of devices more generally referred to herein as "external endpoints."

In a preferred configuration, the server 110, network 162, and first telecommunication devices 134 are Session Initiation Protocol or SIP compatible and can include interfaces for various other protocols such as the Lightweight Directory Access Protocol or LDAP, H.248,

H.323, Simple Mail Transfer Protocol or SMTP, IMAP4, ISDN, E1/T1, and analog line or trunk.

It should be emphasized that the configuration of the switch, server, user telecommunication devices, and other elements as shown in Fig. 1 is for purposes of illustration only and should not be construed as limiting the invention to any particular arrangement of elements.

As will be appreciated, the central server 110 is notified via LAN 142 of an incoming contact by the telecommunications component (*e.g.,* switch 130, fax server, email server, web server, and/or other server) receiving the incoming contact. The incoming contact is held by the receiving telecommunications component until the server 110 forwards instructions to the component to forward or route the contact to a specific contact center resource, such as the IVR unit 122, the voice mail server 118, and/or first or second telecommunication device 134, 138 associated with a selected agent. The server 110 distributes and connects these contacts to telecommunication devices of available agents based on the predetermined criteria noted above. When the central server 110 forwards a voice contact to an agent, the central server 110 also forwards customer-related information from databases 114 to the agent's computer work station for viewing (such as by a pop-up display) to permit the agent to better serve the customer. The agents process the contacts sent to them by the central server 110. This embodiment is particularly suited for a Customer Relationship Management (CRM) environment in which customers are permitted to use any media to contact a business. In a CRM environment, both real-time and non-real-time contacts must be handled and distributed with equal efficiency and effectiveness.

According to the invention, included among the programs executing on the server 110 are an agent and contact selector 220 and repeat contact determining agent 232. The selector 220 and agent 232 are stored either in the main memory or in a peripheral memory (*e.g.*, disk, CD ROM, *etc.*) or some other computer-readable medium of the center 100. The selector and agent collectively effect an assignment between available contacts and available agents in a way that tends to maximize contact center efficiency. The selector 220 uses predefined criteria, particularly the relatedness of the current contact to other, typically prior, contacts, in selecting an appropriate agent to service the contact. The repeat contact determining agent 232 determines and identifies, either through automatic or manual techniques, current contacts that are not "one-and-done" or are related to at least one other contact by the same customer.

As will be appreciated, the definition of " other contacts" can refer to one of two possibilities. In one application, " other contacts" refer only to discrete contacts received at other times; in other words, " other contact" is contact dependent. Under this construction, other contacts would exclude resource-to-resource transfers during servicing of a work item. In another application, " other contacts" considers each resource/customer interaction as a separate contact; in other words " other contact" is agent dependent. Under this construction, "other contact" includes all of the contacts of the first application (when only serviced by one resource before termination) and each interaction of a resource and the customer. For example, if a work item is first serviced by an IVR, then by a first agent, and finally by a second agent before contact termination, the agent 232 would consider this to be three contacts. The first application is particularly applicable where the existence of related(other)

contacts is used in work item or contact routing decisions, and the second application is particularly applicable to collecting one-and-done statistics to measure contact center performance and/or resource performance. In the second application, each instance of a related contact of a specific skill being serviced by an agent during a specified performance period is noted in the agent's corresponding profile for the skill. In more elaborate applications, the contact center would attempt to track who the prior agent(s) were that serviced the prior related contact(s). Each contact serviced by the agent during the selected performance period that is not related to a prior and/or subsequent contact can, in some applications, be assumed to be a one-and-done contact, which can be used as a performance metric for the agent.

The agent profiles are typically maintained and updated by a profile generator (not shown). Once the contact has been handled, the generator collects selected metrics for the contact. These metrics include (but are not inclusive of) the skill of the agent servicing the contact, the identifier of the agent, the duration of the contact, the transaction or contact type (*e.g.*, catalog sale, information request, complaint, *etc.*), the time-of-day, and the result or disposition (*e.g.*, the type of sale, units sold, information requested, revenue generated, service ticket closure or escalation, the information provided, *etc.*). The generator should also include the following ratings: a self-rating of the servicing agent, a supervisor's rating of the agent's proficiency in handling the contact, the customer's rating of the agent's proficiency in handling the contact, any third party rating services' comments on the agent's proficiency in handling the contact,, and any other satisfaction and other survey ratings. These metrics and ratings are then stored in the database 114, such as CMS 228. The

metrics over a selected period of time are typically stored under each profile. Thus, each profile typically includes metrics associated with a plurality of contacts serviced by the agent for each agent skill. The information can be weighted by age. Weighting favors data obtained from more recent contacts over data obtained from contacts in the more distant past. The generator can then use the collected information to generate a set of scores for a set of metrics, such as a proficiency score and an agent satisfaction score for each skill. Typically, there is a plurality of profiles for each agent, with each profile corresponding to a respective skill of the agent. In one configuration, each profile for a selected agent has a corresponding measure of the number or percentage of contacts of the corresponding skill serviced by the selected agent that are not one-and-done or are repeated related contacts from the same customer. This measure may be used in deciding which of two possible agents will be used to service a current contact; that is, the preferred agent would likely be the agent having the lower one-and-done measure.

The agent 232, when a contact is received, determines whether the contact is related to another contact by the same customer. Such information can be used to provide special service treatment to the contact (such as sending such contacts to an appropriate destination or recording the contact interaction), monitor contact center performance, identify product types that are frequently the subject of repeated contacts by the same customer, identify customers who initiate repeated contacts regarding the same subject matter and the frequency with such repeated contacts are received from the customer, monitor agent performance (with a higher incidence of repeated contacts being considered a metric of poorer agent performance), and the like. If the number of contacts received in a specified period of time,

such as in the course of a working day, or by a specified resource that are related to another contact is known, then it may be reliably assumed that the remaining contacts received in the specified time period or by the specified resource were not related to other contacts from the same customer. Stated another way, if there are contacts from the same customer during a specified time period (e.g., working day, etc.) that are not related to one another then the contacts can each be reliably considered one-and-done. There are several techniques to identify related contacts. For example, a trouble ticket number, case number, claim number, invoice number, customer phone number, or other subject matter identifier associated with a prior contact may be received from the customer in the current contact. The number may be provided to a servicing agent or to an automated resource, such as an IVR, by the customer. In one configuration, after termination of the contact the last agent to service the contact inputs contact-related information into the respective customer's profile. The information includes a description of the subject matter of the contact and the result. The description may include a subject matter identifier defining a general class or type of purpose of the contact. For example, a first identifier may be associated with a first contact purpose and a second different identifier with a second different contact purpose. The customer, during the current contact, may be solicited by a human agent and/or an automated resource as to whether the current contact is related to a prior contact. A time interval can be used to distinguish between one-and-done contacts and non-one-and-done contacts. If a contact from a customer is received within a selected time period following a prior contact by the same customer, the second, later contact can be assumed to be related to the prior contact, and, if the contact is not received within a selected time period following a prior contact by the same

customer, the second, later contact is assumed to be unrelated to a prior contact by the same customer. Contextual analysis could be performed on the customer's (and/or the servicing agent's) oral and/or written statements to a contact center resource to identify key words indicating that the contact is a repeat contact related to an earlier contact. The key words could be identified using voice recognition techniques to produce a transcript of the statement's followed by parsing by an algorithm that identifies key words, such as "earlier", "again", "called", "contacted" and the like. The acoustic "fingerprint" or spectral content of one or more spoken words can be used to relate the contact to another contact by the same customer. The algorithm could also look for a reference to a product model number, serial number, type, and the like for which the customer had previously called. In the case of email, instant messaging, and other non-real-time contacts, digital text is already present in the communication and can be subjected to parsing by the algorithm. For example, the algorithm could examine the "regarding" or "subject" line on the email or instant message for contact-relatedness information. The algorithm could monitor the text appearing on the servicing agent's screen or monitor for contact-relatedness information. During or after servicing of the contact, the servicing agent could indicate whether the contact was or was not related to another contact by the same customer. In a non-real-time contact, the receipt of information from a cookie on the customer's computer can indicate relatedness to a prior contact. Also, the receipt of a completed form previously provided to the customer in an earlier contact can establish relatedness to the prior contact.

As will be appreciated, it can be important to remove certain types of "related contacts" from the number of related contact instances attributed to a selected agent. For

example, the customer may contact the contact center by means of multiple channels, such as email and live voice, before receiving a response to obtain an answer to the same question. Although the contacts are technically related and discrete, they should not be tracked as not-one-and-done. In another example, a first agent handles a first contact of a first customer while a second agent handles a second related contact of the first customer. As a result of the second agent's participation, the first customer makes no later related contacts with the contact center. The first agent should be credited with the not-one-and-done contact while the second agent should be credited with a final disposition of the first customer's needs. In other words, the first agents' not-one-and-done indicator is incremented by one while the second agent's indicator remains the same.

The operation of the repeat contact determining agent 232 is provided in Fig. 4. In decision diamond 400, the agent 232 determines if a contact center resource (whether automated or human) has completed its portion of a contact. This determination could be done on a resource-by-resource basis or only on a contact-by-contact basis. In the former case, decision diamond 400 is satisfied when the contact is transferred from one resource to another resource. In the latter case, the decision diamond is satisfied only when the contact is terminated with (all resources of) the contact center. The agent 232 repeats decision diamond 400 until such a completion is identified. If a completion is identified, the agent 232 determines the result. The result includes whether the purpose of the customer's contact is believed to be fully serviced, whether a further contact with the customer is scheduled, required or anticipated, and/or closed. As noted above, "prior contact" can be determined on a contact-dependent or agent-dependent basis. In the former case, the result is determined

after contact termination. In the latter case, the result is determined after a resource has completed servicing the contact. Where one or more resource-to-resource transfers occur in the same communication, the result is determined after each transfer and typically stored in the previously servicing resource's profile. In step 408, the agent 232 updates the customer profile to indicate the date of the contact, the servicing resource(s), the subject matter of the contact, the subject matter number if any, the result of the contact, and contact service duration. After the customer's profile is updated, the agent 232 proceeds to decision diamond 412 and determines whether there is a next (current) contact to be monitored. Decision diamond 412 is repeated until such a contact is identified. If such a contact is identified, the agent 232 returns to decision diamond 400 and monitors the contact.

The operation of the agent and contact selector 220 is shown in Fig. 3.

Referring to Fig. 3, the selector 220 at decision diamond 300 determines whether or not there is a new work item in one of the contact queues 208a-n. Decision diamond 300 is repeated until a new work item is identified. When a new work item is identified, the selector 220 in step 304 retrieves the contacting customer's profile(s) from database 114 and determines whether the new work item is related to a previous contact. If so, the selector 220 proceeds to step 308, in which the enqueued work item is tagged with the number of previous contacts by the same customer related to the same issue. The tagging may be effected by any suitable technique. For example, the tag may be a link to the fields in the customer profile indicating the number of prior contacts related to the same issue. Alternatively, the tag may be the addition of a prior contact field to the description of the work item itself or an identifier that links all contacts from a given customer about a given issue. If there are no

related prior contacts or after step 308, the selector 220 proceeds to step 312. In step 312, the selector 220 qualifies the work item based on a number of selected indicators, including customer value, customer need(s) or purpose of the contact, the number of related contacts, language required to service the customer, channel on which the contact is received, media through which the contact is transmitted (*e.g.*, email, instant messaging, web chat, live voice, *etc.), etc.* Qualification typically depends upon the application of contact center policies and rules. Qualification may assign a priority to the work item, determine an appropriate agent skill to service the work item, need for special treatment (e.g., escalation), deflect an item to an alternate form of service such as content analysis or an IVR, and the preferred agent to service the contact. After completing step 312, the selector 220, in optional decision diamond 316, determines whether or not the work item relates to a new issue for which the customer has not previously contacted the contact center. In one configuration, the selector 220 assumes that the work item does not involve a new issue if there is a prior related contact from the same customer. In another configuration, the selector 220, even though a preliminary conclusion has been reached that the contact is related to a prior contact, determines, such as by forwarding the work item to an automated resource, whether or not the current contact is indeed related to a prior contact. When the contact is not directed in whole or in part to a new issue, or the contact is related to a prior contact from the same customer, the selector 220 determines and applies special treatment to the work item in step 320. The appropriate treatment is typically defined by contact center rules and/or policies. The typical goal of such treatment is to fulfill the purpose of the customer's contact so as to avoid further contacts with the customer relating to the same issue. Treatment can include

measures such as routing the work item to a better skilled agent or an agent specially trained to deal with repeat contacts, activating quality monitoring (contact recording to produce a transcript), initiating observation of the servicing of the work item by contact center resource(s) typically by a supervisor, alerting a business manager or executive or automated technology, increasing the assigned priority of the contact and the like. When the work item is related to a new issue or after completion of step 320, the selector 220 determines which of the qualified agents (as defined by the qualification step 312 and/or special treatment determination step 320) are currently available to service the contact in decision diamond 324. When the most appropriate or most desired agent(s) are currently available, the selector 220 in step 328 selects one of the agents to service the contact. When the most desired agent(s) are not currently available, the selector 220 in step 332 selects the most appropriate queue 208a-n for the work item, sets the priority (or queue position) of the work item in the queue 208a-n, and/or determines a place to park the work item until the desired agent is available. After completing steps 328 and 332, the selector 220 proceeds to and repeats decision diamond 300 for a next work item.

A number of variations and modifications of the invention can be used. It would be possible to provide for some features of the invention without providing others.

For example, the server and/or switch can be a software-controlled system including a processing unit (CPU), microprocessor, or other type of digital data processor executing software or an Application-Specific Integrated Circuit (ASIC) as well as various portions or combinations of such elements. The memory may be a random access memory (RAM), a

read-only memory (ROM), or combinations of these and other types of electronic memory devices.

Any other suitable agent assignment algorithm may be employed for assigning an agent to service a contact. As will be appreciated, the algorithms of Figs. 3 and 4 are only exemplary and not intended to be exclusive or limiting.

The present invention may be implemented as software, hardware (such as a logic circuit), or a combination thereof.

The present invention, in various embodiments, includes components, methods, processes, systems and/or apparatus substantially as depicted and described herein, including various embodiments, subcombinations, and subsets thereof. Those of skill in the art will understand how to make and use the present invention after understanding the present disclosure. The present invention, in various embodiments, includes providing devices and processes in the absence of items not depicted and/or described herein or in various embodiments hereof, including in the absence of such items as may have been used in previous devices or processes, e.g. for improving performance, achieving ease and\or reducing cost of implementation.

Moreover though the description of the invention has included description of one or more embodiments and certain variations and modifications, other variations and modifications are within the scope of the invention, e.g. as may be within the skill and knowledge of those in the art, after understanding the present disclosure. It is intended to obtain rights which include alternative embodiments to the extent permitted, including alternate, interchangeable and/or equivalent structures, functions, ranges or steps to those

claimed, whether or not such alternate, interchangeable and/or equivalent structures, functions, ranges or steps are disclosed herein, and without intending to publicly dedicate any patentable subject matter.